# WORKSHOP SUMMARY

## RFID in 2005: Technology and Industry Perspectives

Wednesday, April 6, 2005
US Department of Commerce
Washington, D.C.

**May 2005**

RFID Information Paper and Summary: http://www.technology.gov/Reports.htm
Technology Administration Website: http://www.technology.gov

On April 6, the U.S. Department of Commerce (USDOC) hosted a half-day workshop on issues in Radio Frequency Identification (RFID), entitled ***RFID in 2005: Technology and Industry Perspectives.*** Nearly 300 people attended, including representatives from government, trade associations, and industry.

The purpose of the workshop was to continue discussions begun at an April 2004 forum titled, *From RFID to Smart Dust: The Expanding Market for Wireless Sensor Technologies*, sponsored by USDOC's National Telecommunications and Information Administration (NTIA).

The primary objective of the April 6 USDOC workshop was to engage stakeholders and industry in discussions that included: the benefits of RFID technology, technology development efforts, current and future applications, privacy and security considerations, and industry's experiences in implementing RFID technology.

Phillip J. Bond, Under Secretary of Commerce for Technology and John M.R. Kneuer, Deputy Assistant Secretary of Commerce for Communications welcomed the attendees and participants and briefly described the Department's activities in promoting innovation in emerging technologies like RFID. Activities mentioned included USDOC participation in a governmental inter-agency RFID working group and the Department's leading role in working with other federal agencies and private industry to develop a new standard for a Personal Identity Verification system and card that will be used by all federal government departments and agencies. Under Secretary Bond also announced the Department was releasing in conjunction with the workshop, an information paper, entitled "Radio Frequency Identification – Opportunities and Challenges in Implementation."

The agenda for the workshop included presentations from two expert observers of the industry and four panel discussions covering RFID hardware, RFID middleware, and perspectives of supplier and retail industries. The fourth panel focused on RFID Privacy and Security, Challenges, and Best Practices.

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| Opening Speakers: | John Parkinson, Capgemini<br>Alex Pang, of the Institute for the Future |

John Parkinson of Capgemini began by evaluating the progress that has been made during the past two years, particularly in the area of standards. He acknowledged that due to the initial efforts of the Auto ID Center at MIT, and subsequent work by EPCglobal, there was fairly good agreement on core issues like spectrum usage, approaching agreement on whether we should be using licensed or unlicensed spectrum, and great progress on interoperability. He believed that major government-led efforts in public safety and security in North America and Europe were forcing the industry to get its act together on interoperable standards between different types of RFID. He believed,

however, that much more work was needed in terms of standards harmonization and agreement on spectrum use. He observed that the specific challenges faced in working with the electro magnetic spectrum and in actually deploying reader networks and tagged items had reignited innovation around RFID with new kinds of ideas about how RFID can work with less infrastructure investment than originally assumed necessary. He cited new applications for the technology---like broad-based security systems, secure authentication and identification for workforces, and speed pay systems for low value items--as examples that are starting to generate belief that RFID will be broadly deployed within both supply chain-oriented and services-oriented industries.

Nevertheless, he said that from his perspective, it was clear that the technologies that are being worked with today will not be the technologies that drive broad deployment. They are too limited, too expensive, and in the general sense could not be relied upon enough to provide broader RFID coverage at an economy level. Rather, new generations of these technologies were evolving rapidly, and perhaps within a year, will likely overcome some of the major current hurdles. He cited as examples, improvements in tag capability and cost, and multi-frequency agile readers that will allow different kinds of RFID schemes to interoperate within the same physical facility.

He remarked that much more work and progress was needed among supply chain participants to harmonize standards around industries and across global trade. Without greater commitment to a common naming standard for goods, the standards issue was likely to become even more acute as more economies came into the global trade system and sought unique naming standards of their own. While this was not just an RFID problem and represented a global trade efficiency problem, it was likely to slow the rate of adoption by reducing the perceived benefits associated RFID.

He also acknowledged that while pilot operations had established strong business cases for applying RFID tags at the case and pallet level, the business case for item-level tagging was much less established beyond high value items in areas like consumer electronics. In his opinion, data was not yet available on whether the total societal impact was great enough, or the costs of provisioning small enough, for the advantages of the technology to be realized for all but the largest organizations. He wondered whether item-level tagging might actually ever be achieved.

He then turned to findings from Capgemini's periodic research poll of consumer perceptions and concerns regarding RFID. He said that the surveys continued to reveal: consumers generally had low levels of awareness of RFID; they were for the most part positive about the benefits when they were explained in terms of ease of use and improved security, but; consumers did have concerns when they were made aware of track and trace capabilities and the potential for invasion of privacy. These findings, he said, implied for industry a challenge in terms of trend setting and educating the mass consumer base around an intelligent dialogue on how to balance opportunities with concerns like the potential for the invasion of privacy.

Concluding, he said that he saw the technology industry remained committed to a dialogue and debate on acceptable-use guidelines for achieving the technology's benefits while allaying growing concerns over misuse. He suggested that this debate be an ongoing one, since the technology continued to evolve rapidly with new innovations and capabilities bringing us somewhat closer to the real fears that some consumers had over misuse. Finally, he said that these issues were not related just to the United States. Because of global trade and the economic interests in emerging economies, like India and China, everyone he said, was affected. He closed by saying that we should, therefore, be striving for guidelines that can be used everywhere in world and that can avoid the great expense of implementing multiple policy frameworks.

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Next, Alex Pang from the Institute of the Future began his presentation by noting that choices made about RFID in the near future can affect the way the technology evolves over the coming decade. The underlying premise was, he said, that no technology exists outside the influence of people, culture, policy, and economics. Therefore, we should be conscious of the consequences of actions we take over the next couple of years. He said that RFID was part of a much broader emerging mix of technologies that had the potential to very substantially impact the way that humans, information, places, and objects all communicate. His understanding of consumer attitudes was that many of the applications of RFID technology for security, like hospital ID bracelets, airport security, or even RFID tags embedded in casino chips, were generally unproblematic in terms of policy and privacy concerns, as they represented only another layer on top of existing security systems.

He then said that a second area of application growing in significance and edging into more complicated policy territory, was the use of RFID in health. He gave the example of applications like tags for quality assurance and drug anti-counterfeiting. He said he anticipated seeing more applications of RFID technologies in assisted health systems within the next few years, particularly in uses like helping the elderly keep track of medical regimes or avoid drug complications from adverse drug combinations. He saw this as part of a much broader introduction of RFID into the household.

A third, and potentially greatest area for growth, he said, was application driven by user reinvention. Using the examples of the web, the personal computer, and the IPOD, he said that user reinvention could be tremendously important for the growth of any number of technologies. He predicted that as new uses led to new users, user reinvention could potentially turn customers into the equivalent of a giant, free R&D lab for companies, where customer innovations lead to new products. This process could have great significance for RFID technologies and help speed acceptance and familiarity with the new technologies. He added that with more things having embedded IT and software, the dynamics of user reinvention were likely to spread.

He continued by characterizing RFID as one of a number of connective types of technologies, each one representing incremental improvements over prior technologies,

and as part of a disruptive group that may have consequences for business and daily life as profound as the rise of the internet. One way of looking at the impact of these technologies, he said, was in terms of the concept of "the internet of things." This concept, he explained, was that these technologies, like the world wide web, were only part of a much potentially bigger network that connected humans, objects, information, and places, using technologies like Internet Protocol Version 6 (IPv6), Geo-tagging, and RFID. He envisioned that a possible consequence of the growth of this "internet of things" was the obsolescence of the metaphor of cyberspace—that alternate universe of data which is currently only accessible through the narrow portals of computers monitors keyboards and mice. He anticipated that when data becomes bound to places, when intelligence is woven into all kinds of things and environments, and content can be retrieved *in situ*, then cyberspace may become a kind of overlay on top of the everyday world, rather than an alternate separate world. He saw RFID as one key to building this world, which will be built and populated by its users. For this to happen, he believed that several things were necessary: 1) open standards, as aptly demonstrated by the experience of the internet and personal computing where everyone benefits, and; 2) new design choices to make tags more friendly and accessible to people. Regarding latter, he said that companies should be open about their deployment of RFID, since such a strategy can help diffuse some of the privacy concerns and allay fears over the sharing of information.

Concluding, he said that it was unlikely that 100 years from now RFID would be remembered mainly for tightening the supply chain or helping retailers develop a better awareness of the state of their stores, even though subsequent generations of that technology may still be used that way. Rather, it was going to be remembered as one of a set of paradigm-changing technologies that brought cyberspace and the world together; gave intelligence and unique identities to things; and opened up new means for people to link to information, objects, places and each other. The decisions we take now, he said, would determine that future.

The final speaker before the panel discussions was John Kneuer**,** Deputy Assistant Secretary of Commerce for Communications and Information. He began his comments, by remarking that while RFID technologies have been in existence for quite some time, it was the convergence of the radio world, with today's greater computing power and, leveraged with a simple technology like RFID, that provided such a powerful driver for a variety of applications and for our economy. He said that it was therefore only natural that the Technology Administration and the National Telecommunication and Information Administration were working together within the common space of RFID. He explained that as NTIA began this process a year ago by looking into RFID needs for harmonization, it realized that RFID was not just an issue of spectrum, but with the power that comes from the convergence of these technologies, RFID was about much broader policy implications. He then closed his remarks by introducing the moderator of the first panel, who was to lead a discussion of hardware issues.

## Summary of Theme One - Hardware

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| **Panel Moderator:** | Sue Hutchinson, EPCglobal US |
| **Panelists:** | William Allen, Texas Instruments (TI) |
| | Fraser Jennings, Savi Technologies |
| | Scott Silverman, Applied Digital |
| | Jeff Fischer, Reva Systems |
| | Gaylon Morris, Met-Labs |

Panel moderator Sue Hutchinson opened the discussion by stating that RFID technology was now commonly known as the "world's oldest new technology." She observed that though this technology has been evolving over the past fifty years, it has undergone several changes in the past two to three years and is now viewed as the key enabling technology to optimize global supply chain operations.

William Allen of Texas Instruments then presented a historical perspective of TI's RFID business, highlighting TI's focus on passive tags and applications where TI RFID products are used. He stated that the RFID industry responds to concerns and lessons learned which enables RFID technology to incorporate feature sets based on application requirements.

The next presentation, by Fraser Jennings of Savi Technologies, focused on Savi's core expertise in active tags. He highlighted the need to focus on supply chain visibility, resulting from multiple technologies. His presentation categorized the application of passive and active tags in different parts of the supply chain and in the packing process. He illustrated how active RFID tagging can build nested visibility, and stressed the need to have total end-to-end visibility in the supply chain.

Implantable RFID technology was the focus of the next presentation from Scott Silverman of Applied Digital. He presented a history of Applied Digital's RFID product, the Verichip™, which was recently approved by the FDA as a Class II medical device. In addition to the medical applications of RFID technology, he also touched on how products were being developed for a variety of security, financial, defense, homeland security and secure-access applications. The presentation stressed the need for a comprehensive and adequate privacy policy associated with such applications and technologies.

Reva Systems' Jeff Fischer highlighted in his presentation the crucial role of standards in achieving full scale deployment of this technology. He said that significant efforts have been spent in making RFID tags respond to readers in a reliable manner. He observed that in order to get full scale deployment, what was required was a sound air protocol together with a reliable mechanism of control, and good coordination amongst readers. He added that "the air protocol must be a worldwide standard." Within this context he highlighted the role of the EPC Gen2 specification and its potential benefits and challenges.

Met-Labs work in testing and conformity assessment of RFID technology was highlighted by the final panelist in the discussion, Gaylon Morris. His presentation highlighted the variety of issues associated with such testing, including performance issues such as reading tags in sequence, the need for globally recognized performance test specifications, the effect of regulation on testing and certification, and defining simulated performance test methods and hardware conformance.

In the general discussion that followed, the panelists observed that although RFID technology has been largely driven by supply chain mandates, more applications will likely emerge as standard protocols are developed and adopted. It was noted that some very promising applications may exist in the medical arena. However, it was also observed that technology development and application will be impacted significantly by worldwide regulatory issues, and such issues could create an anti-competitive environment due to differences in regulatory principles and practices. An additional comment was made by a panelist that globally accepted standards can help bridge these differences.

**Key points to takeaway from this panel discussion included:**

- The recognition that RFID technology is evolving very rapidly, but still is in its infancy.
- There is vast potential to improve the lives of U.S. consumers with the widespread use of RFID technologies.
- Success in developing this technology and its associated applications will need a strong partnership between technology companies, standards bodies, regulatory and non-regulatory agencies, and industry and consumer groups. Challenges in worldwide harmonization will also be a very significant obstacle to be addressed.

## Summary of Theme Two - RFID Middleware

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| **Panel Moderator:** | John Healy, 360Solutions Corporation |
| **Panelists:** | Nicolas Tsougas, SRA<br>Tom McAuliffe, Motorola<br>Denton Clark, Lockheed Martin,<br>Michael Ricciardeli, Verisign |

The panel was moderated by John Healy from 360Solutions Corp. and focused on the software that is used to capture the data on RFID tags and store in databases. The panelists generally agreed that RFID will not overcome bad management processes already existing in the supply chain, but can potentially help identify these processes and assist with process redesign. Other challenges for middleware cited by the panelists included security of the data and interoperability of systems and data across enterprises.

According to Nicolas Tsougas, a Senior Logistics Analyst for the DOD (through contractor SRA), a typical company already has at least 70% of the data it needs, and RFID can help transport this data. However, software systems should be able to filter "actionable data" from irrelevant data. Laxmiprasad Putta, CEO of OAT Systems, echoed these comments and stressed the fundamental "four C's" of RFID middleware: capture, control, consistency, and context.

Tom McAuliffe, Vice President of Strategy and Business Development at Motorola, emphasized the commercial benefit of applying RFID technology to track content and location of cargo containers. He said that for global movement, a standards-based open architecture is necessary. He suggested that software should be considered a component of the entire wireless communication system for RFID that uses "handoffs" (like cell phones) for asset tracking.

Denton Clark, a Systems Integration Manager for Lockheed Martin, then pointed out that the four phases of planning an RFID deployment make the process problems more visible: 1) identify operation requirements, 2) establish goals, 3) integrate applications, and, 4) collaborate business development. Eric Domski, RFID Solution Director of SAP, used an example of how RFID data capture can be a driving force in other business software applications: as the green light on an RFID reader confirms an item or shipment has been loaded onto a truck, it also triggers any relevant applications in the company's network that process the item or shipment.

Michael Ricciardeli from Verisign discussed its work in EPC's development of the Object Naming Service (ONS) infrastructure, similar to the Domain Name System (DNS) of the World Wide Web. He estimated ubiquitous use of RFID technology in the supply chain may result in trillions of queries occurring on a daily basis, and a reliable network will be essential. Stephen Miles from the Auto-ID Lab at MIT outlined two new initiatives focusing on interoperability and data management. He noted that standards are more important with more complex networks.

**Key points to takeaway from this panel discussion included:**

- Tags and readers generate more reads that may be required at a given time.
- RFID is really part of a larger wireless communications system.
- There will be increasingly more intelligence at the edge.

## Summary of Theme Three – Suppliers and Retailers

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| **Panel Moderator:** | Elliot Maxwell, Moderator, Johns Hopkins University |
| **Panelists:** | Lori Denham, Retail Industry Leaders Association (RLIA) Brad Bass, Hewlett Packard (HP)<br>Susan Chapman, General Motors (GM)<br>Pam Stegeman, Grocery Manufacturers of America (GMA)<br>Mark MacCarthy, Visa<br>John Howells, Healthcare Distribution Management Association (HDMA)<br>John Phillips, Pepsico |

Panel moderator Elliot Maxwell, began the session by observing that since RFID is an infrastructural technology, we do not yet know all the ways in which it will be used. The technology is still being created and similar to the Internet, new uses, applications and capabilities are still being developed. Mr. Maxwell posed several questions to the panel regarding use of RFID technology including, how do processes go from being a "paper chain to a chain with objects that all communicate."

Lori Denham, from the Retail Industry Leaders Association (RLIA), stated that RFID is still in its infancy and the technology is in a discovery and exploratory mode. She listed seven benefits for retailers from the use of RFID that included potential supply chain savings, reduced shrinkage (a generic term covering various reasons for the loss of merchandise) and theft in the supply chain, and greater ease in issuing product recalls. Supply chain savings translate into benefits for consumers, resulting in more satisfied customers.

Brad Bass, Hewlett Packard (HP) pointed out that HP was an early adopter of RFID technology and has used the technology to gain supply chain efficiencies. He said that HP began RFID testing in 2002 and has been tagging pallets and cases in response to the Wal-Mart mandate. RFID benefits that have since accrued to HP include the elimination of manual processes for inventory control, decreasing inventory control time, and realization of downstream benefits in areas such as product returns and retirement.

Next, Susan Chapman of General Motors (GM) pointed out that while users of RFID needed to be cognizant of consumer privacy concerns, these privacy concerns associated with RFID technology should not be confused with the use of radio frequency (RF) devices that enable safety and other consumer benefits. She stated that although GM believes kill switches should be available for certain automotive applications, the company would rather seek "accommodation for RFID applications where it may not be possible, practical, or in the consumer's best interest to disable or turn the RFID off." In this regard, Ms. Chapman cautioned that a patchwork of state enacted RFID legislation would create an undue burden on manufacturers and could inhibit the development of new RF applications. She stated

that any regulatory effort should be focused on the potential harm that could be caused by the misuse of information collected through RFID.

The next panelist, Pam Stegeman of the Grocery Manufacturers of America, pointed out that the use of RFID was basically about solving business issues, and as such, users needed to be realistic about the potential costs and benefits of its application. She understood that the benefits of using RFID varied by the type and category of product. For example, the return on investment (ROI) for individual item tagging on high-value, low volume, products was currently much greater than for tagging low value, high volume products. She also said that the GMA believed that before implementing an RFID program, users needed to carefully define process changes, and share data freely in a standardized and timely manner. What was also needed, she added, was a way to facilitate global data synchronization with a company's trading partners.

The discussion then shifted to Mark MacCarthy from Visa, who made the point that the costs for contactless cards and smart card technologies were dropping rapidly and demand was increasing. He said that consumers polled had indicated a willingness to use contactless cards for certain types of purchases, and they cited the convenience, speed, and security as the major benefits of using such cards. Likewise, merchants reported faster transactions times as a major benefit, which enabled them to serve more customers. In closing his remarks, Mr. MacCarthy confirmed that the first VISA contactless cards for financial transactions were expected to be deployed later this year.

Moving to healthcare, John Howells from the Healthcare Distribution Management Association (HDMA) stated that the major RFID benefits in healthcare included improving patient safety and combating counterfeit drugs. He added, however, that the challenges to RFID applications included: the cost of item level tagging; tag performance; data ownership and sharing issues; privacy issues; supply chain integration and; the development of standards and regulations. In this regard, he said, HDMA has issued a number of RFID healthcare white papers geared towards educating healthcare providers on the use of the technology.

The session closed with some comments from John Phillips of Pepsico. He confirmed that Pepsico was using RFID applications to track deliveries to stores. Specifically, the company was applying tags at the case and pallet level. Mr. Phillips said that tag selection was proving critical, and that the tag selection process is part art and part science. He concluded by saying that tagging for most food items is not likely to have a good ROI.

**Key points to takeaway from this panel discussion included:**

- The range of applications for RFID technology is immense, and spans many different industries.
- RFID and related technologies also rely on supply chains, consisting of technology suppliers and providers of middleware and integrators.

## Summary of Theme Four - Privacy & Security Overview

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| **Panel Moderator:** | Daniel W. Caprio, Jr., Deputy Assistant Secretary for Technology Policy and Chief Privacy Officer, USDOC |
| **Panelists:** | James A. Lewis, Center for Strategic and International Studies |
| | Susan McDonald, Federal Trade Commission |
| | Sandra Hughes, Procter & Gamble |
| | Tom Kellermann, The World Bank |
| | Paula Bruening, Center for Democracy and Technology |
| | Burt Kaliski, RSA Security Inc. |
| | Paul Martino, Alston & Bird |

Deputy Assistant Secretary (DAS) Daniel Caprio from the Technology Administration moderated the fourth panel and opened with remarks on the security challenges facing RFID and its widespread adoption in the global market. DAS Caprio recognized that RFID technology can enable commerce, innovation, and economic growth. Therefore, it is important for a market oriented approach to implement smart privacy and security policies to give consumers the tools and choices they need to protect themselves.

James Lewis, from Center for Strategic and International Studies, noted that technology is important, but the appropriate rules and structure must be put into place in order to achieve the greatest benefit. He said the proliferation of wireless applications in our environment is resulting in an expansion of the public domain – while at the same time there is reasonable expectation that privacy is shrinking. Mr. Lewis said we must address how we shape the use of data and protect the consumer from new vulnerabilities. Mr. Lewis also said that when consumers were recently polled on RFID, many had privacy concerns, but only a small percentage opposed the use of RFID. He added that "one size fits all" is not the best policy approach for RFID – the specific function or application must be taken into account when developing a RFID privacy and security strategy. In closing, Mr. Lewis said that a mix of government regulation, self-regulation and public/private partnerships is the optimal approach.

Susan McDonald, Federal Trade Commission (FTC), made the point that industry is responsible for full disclosure of the use of RFID to consumers. She also supported a self-regulatory approach and the importance of proper education of consumers. Ms. McDonald also said that the FTC uses section 5 of the FTC Act to investigate and enforce the privacy policies used by companies.

Sandra Hughes, Procter & Gamble (P&G), said that P&G is working together with partners under EPCglobal to address policy concerns for RFID tags used on consumer product goods. Ms. Hughes said that industry working in coordination with EPCglobal will allow for a cohesive approach to the marketplace – i.e., Public Policy Steering Committee. She said P&G's approach to RFID includes: notice to consumers when RFID is in use, a choice to buy products with or without RFID tags, consumer education

programs, and proper retention and security of RFID data. Ms. Hughes mentioned some of the activities taken on by the EPCglobal Public Policy Steering Committee, including:

- Usage guidelines
- Accountability
- Technical solutions
- U.S. policymaker education and outreach
- EU issues resolution, education and outreach
- Consumer education request proposals
- Definition of the issues beyond privacy

Tom Kellermann, The World Bank, emphasized that RFID presents a high operational risk and is hard to secure. He suggested that a layered security structure will help ensure data security and consumers' privacy. Mr. Kellerman also stated that RFID should not be authorized for sensitive items such as payments.

Paula Bruening, Center for Democracy and Technology, said that we should be forward-thinking when developing RFID technology solutions. Ms. Bruening also said that it is important to provide consumers a choice in purchasing products with or without RFID tags.

Burt Kaliski, RSA Security Inc., pointed out several challenges facing RFID developers: authenticating the reader to the tag, kill tags, reader verification, and variable identity. Dr. Kaliski also stated that authentication is an important tool to build trust. In closing, he said that technology can be flexible toward specific policy issues.

Paul Martino, Alston & Bird, said that tremendous benefits can be derived from RFID, but it is critical to address policy concerns. He stated that the goal is to build appropriate privacy and security measures into RFID at the outset, rather than trying to retrofit the technology in the future (i.e., the Internet). Mr. Martino emphasized that both consumer and corporate education were key to a successful privacy and security policy. In closing, he provided the following points:

- A continued dialogue and education are needed
- Self-regulation can work
- Only legislate if there is urgent need or identifiable harm
- Examine the economic impact

**Key points to takeaway from this panel discussion included:**

- It is important for industry to implement smart privacy and security policies that sustain rapid innovation, while giving consumers the tools and choices they need to protect themselves.

# Workshop Agenda

**8:30 – 9:00 am Registration**

**9:00 – 9:40 am Welcome** and Opening Remarks
Audio (40:29 minutes)

**Phillip J. Bond**, Under Secretary of Commerce for Technology, Department of Commerce
Opening Remarks

"RFID: getting beyond the supply chain. Lessons from early deployments"
**John Parkinson**, Capgemini
Presentation

“The Futures of RFID: Security, Health and User Reinvention"
**Alex Pang**, Institute for the Future
Presentation

**9:40 – 9:45 am John M. R. Kneuer**, Deputy Assistant Secretary of Commerce for Communications and Information, Department of Commerce
Audio (40:29 minutes)

**9:45 – 10:30 am** Industry Perspectives – RFID Hardware
Audio (43:26 Minutes)

Moderator: **Sue Hutchinson**, EPCglobal US

**William Allen**, Texas Instruments
Presentation
**Fraser Jennings**, Savi Technologies
Presentation
**Scott Silverman**, Applied Digital
Presentation
**Jeff Fischer**, Reva Systems
Presentation
**Gaylon Morris**, Met-Labs
Presentation

**10:30 – 11:25 am** Industry Perspectives – RFID Middleware
Audio (63:37 minutes)

Moderator: **John Healy**, 360Solutions Group

**Nicholas Tsougas**, SRA
Presentation
**Tom McAuliffe**, Motorola
Presentation
**Laxmiprasad Putta**, OAT Systems
Presentation
**Denton Clark**, Lockheed Martin
Presentation
**Michael Ricciardelli II**, Verisign
Presentation
**Stephen Miles**, MIT Auto-ID Labs
Presentation
**Ted Tanner**, Microsoft
Presentation
**Eric Domski**, SAP-America
Presentation

**11:25 – 11:45 am Break**

**11:45 – 12:35 pm** Industry Perspectives – Suppliers and Retailers
Audio (64:52 minutes)

Moderator: **Elliot Maxwell**, Johns Hopkins University

**Lori Denham**, Retail Industry Leaders Association
Presentation
**Brad Bass**, Hewlett Packard
Presentation
**Susan Chapman**, General Motors
Presentation
**Pam Stegeman**, Grocery Manufacturers of America
Presentation
**Mark MacCarthy**, Visa
Presentation
**John Howells**, Healthcare Distribution Management Association
Presentation
**John Phillips**, Pepsico

**12:35 – 1:20 pm RFID** Privacy and Security: Challenges and Best Practices
Audio (45.52 minutes)

Moderator: **Daniel W. Caprio**, Jr., Deputy Assistant Secretary for Technology Policy and Chief Privacy Officer of the Department of Commerce
Remarks

**James A. Lewis**, Center for Strategic and International Studies
**Susan McDonald**, Federal Trade Commission
Presentation
**Sandra Hughes**, Procter & Gamble
Presentation
**Tom Kellermann**, The World Bank
Presentation
**Paula Bruening**, Center for Democracy and Technology
**Burt Kaliski**, RSA Security Inc.
Presentation
**Paul Martino**, Alston & Bird

**1:20 – 1:30 pm Conclusions and Wrap-up**

**Daniel W. Caprio**, Jr., Deputy Assistant Secretary for Technology Policy and Chief Privacy Officer of the Department of Commerce
Remarks